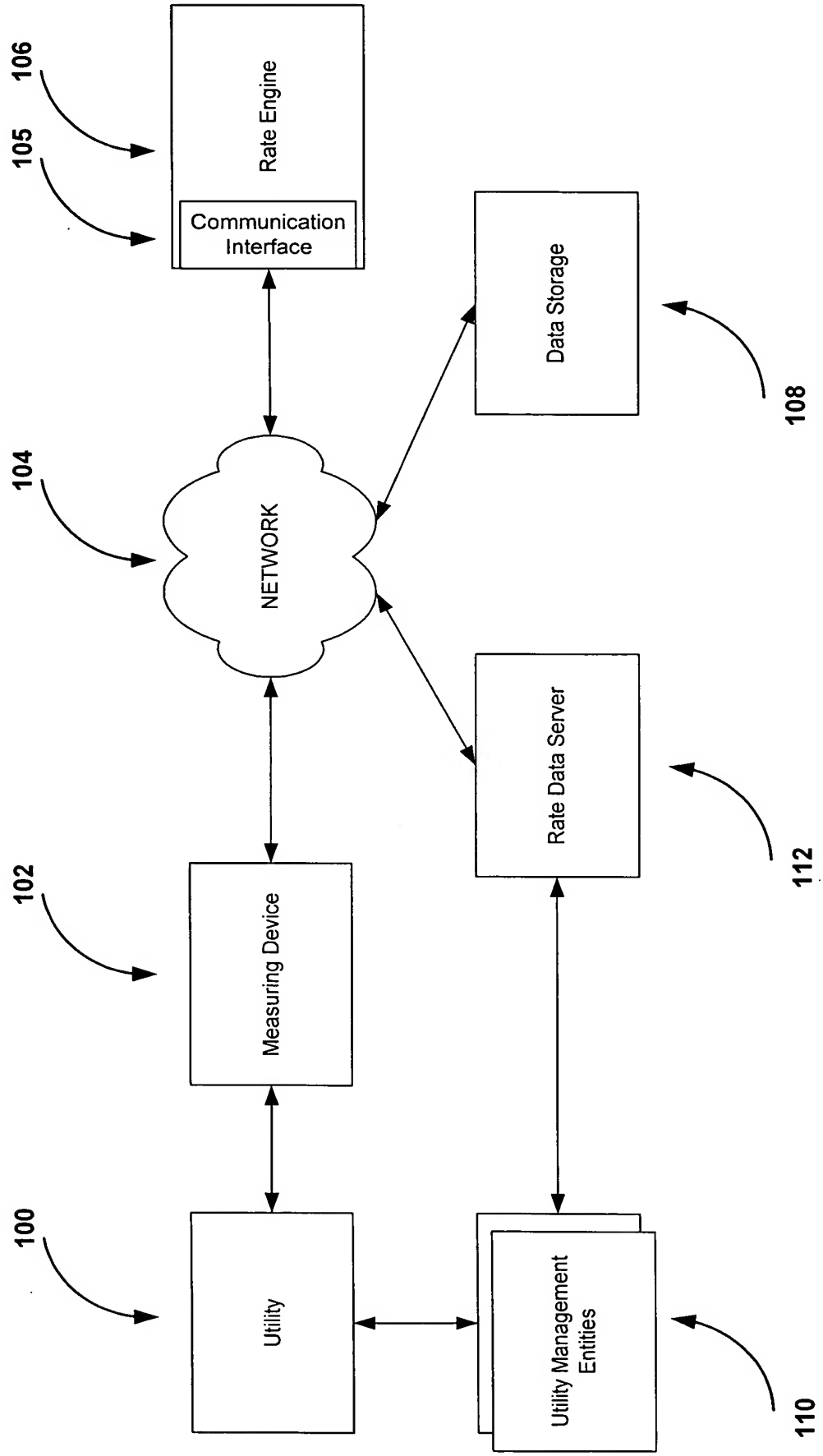

Rate Engine
Communication Interface
106
105
Data Storage
108
104
NETWORK
Rate Data Server
112
102
Measuring Device
100
Utility
Utility Management Entities
110

FIG. 1a

FIG. 1b

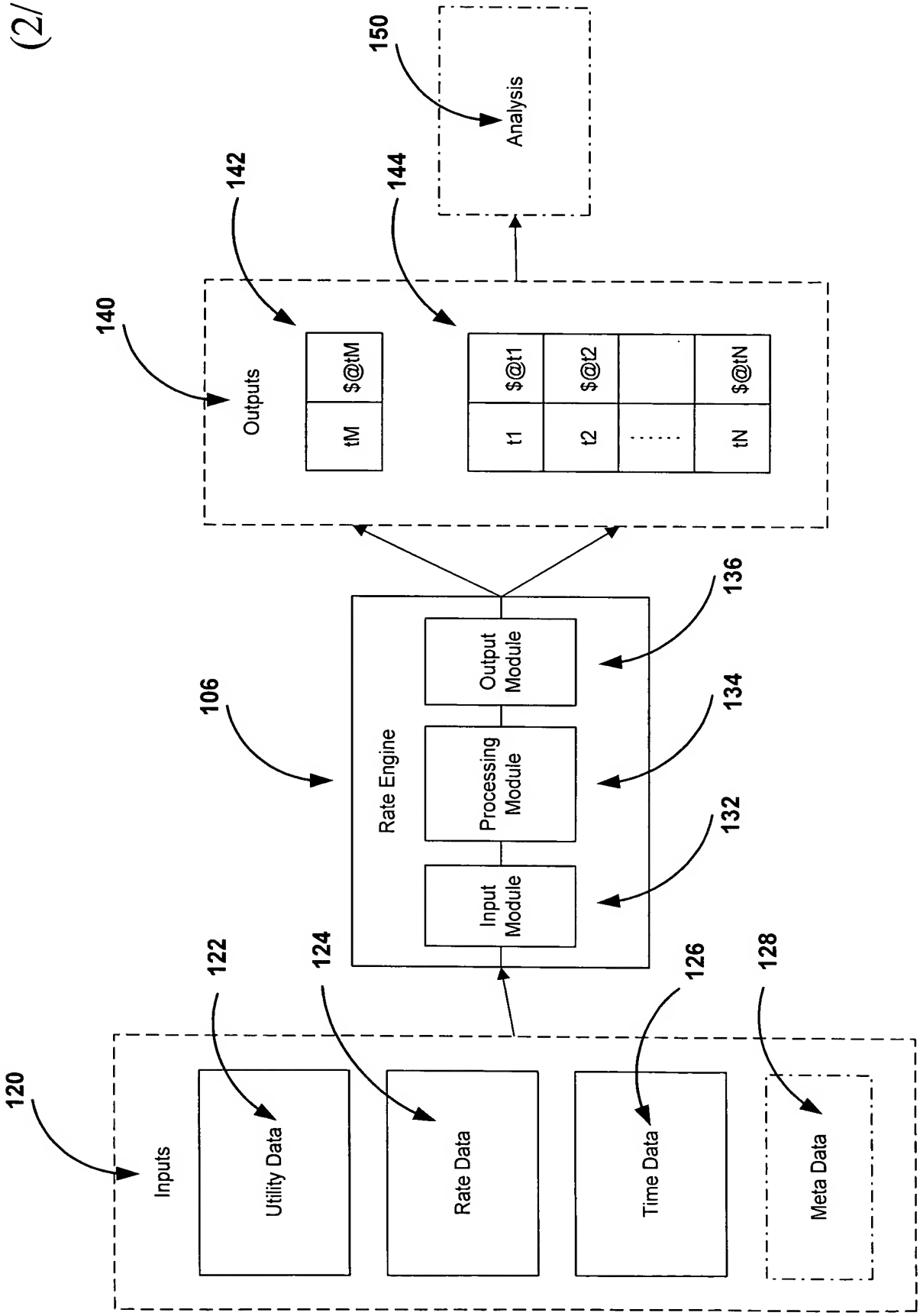
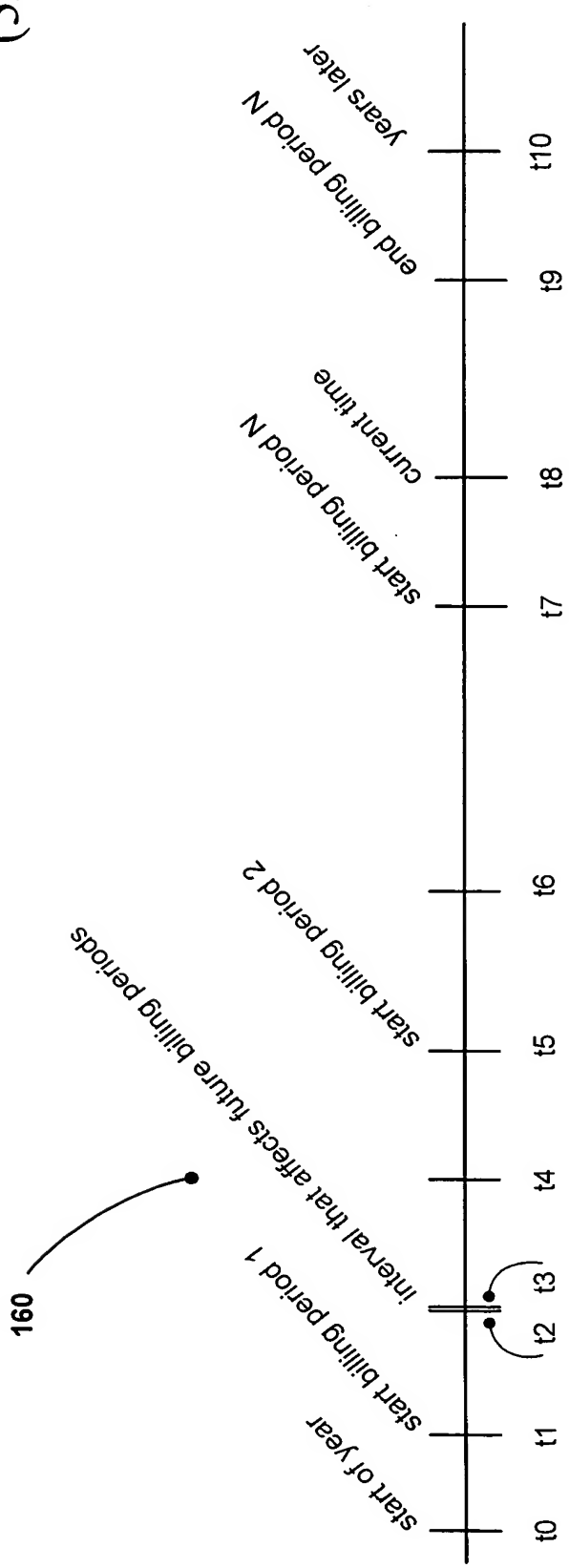

120
Inputs
122
Utility Data
124
Rate Data
126
Time Data
128
Meta Data
106
Rate Engine
136
Output Module
134
Processing Module
132
Input Module
140
Outputs
142
tM
$@tM
144
t1
$@t1
t2
$@t2
.....
tN
$@tN
150
Analysis

FIG. 2



t2 to t3 is one logging interval, smallest granularity

t1 to t5 is one billing period

t3 to t4 is subset of billing period 1

t4 to t6 is interval spanning two billing periods

t7 to t8 is bill to date

FIG. 3

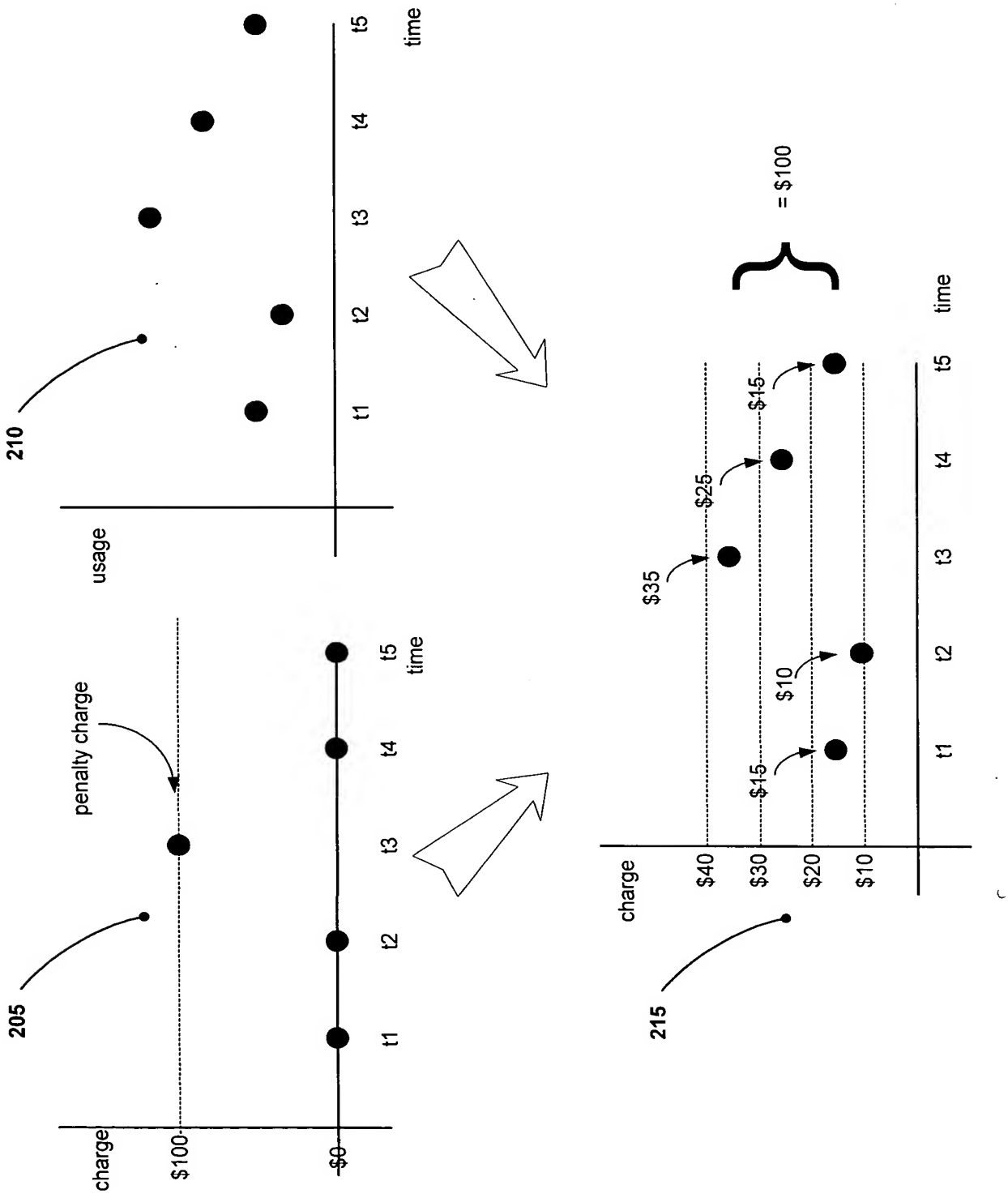

210
usage
time
t1
t2
t3
t4
t5
205
penalty charge
charge
$100
$0
215
= $100
$35
$25
$15
$10
$15
$40
$30
$20
$10

FIG. 4a

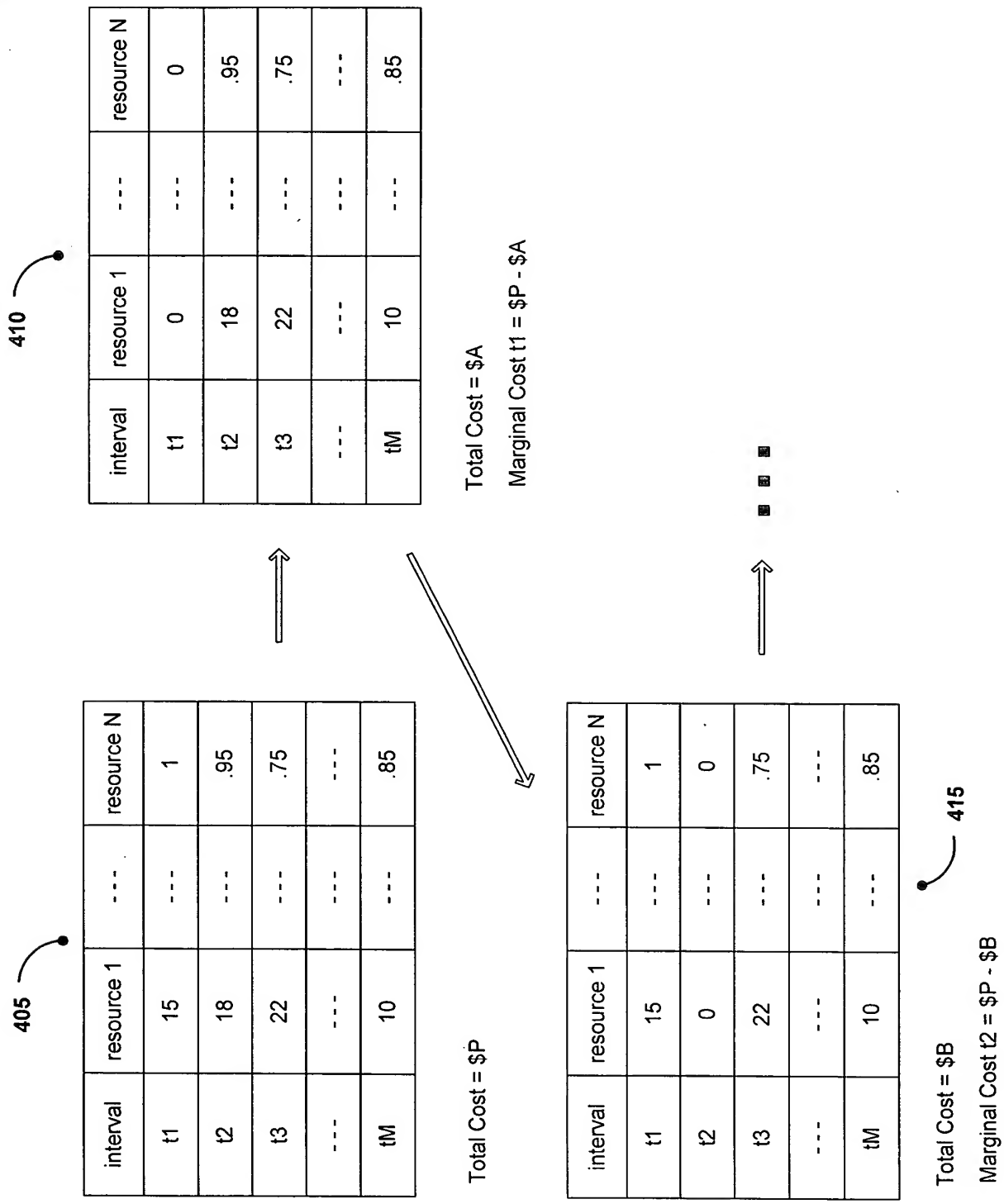
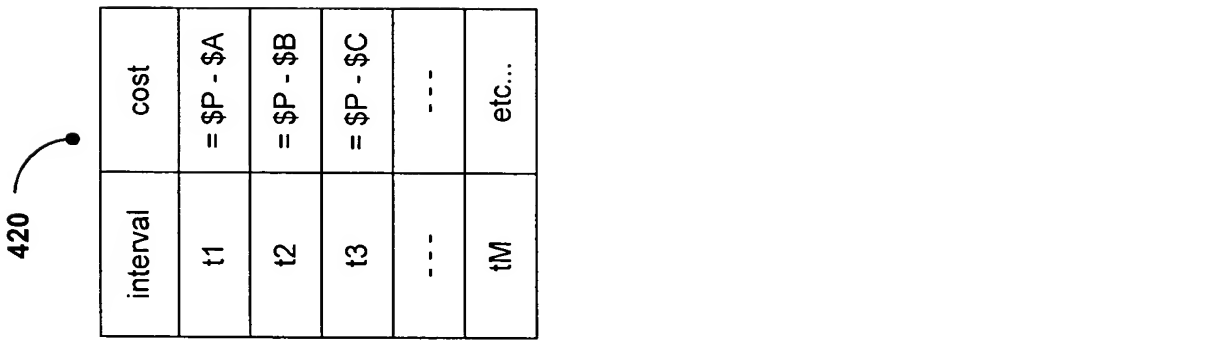

405
410
415
interval
resource 1
---
resource N
t1
t2
t3
tM
15
18
22
10
1
.95
.75
0
.85
Total Cost = $P
Total Cost = $A
Marginal Cost t1 = $P - $A
Total Cost = $B
Marginal Cost t2 = $P - $B

FIG. 4b


420
interval
cost
t1
= $P - $A
t2
= $P - $B
t3
= $P - $C
---
tM
etc...
425
(cost t1) + (cost t2) +... + (cost tM) = $Q
sometimes $Q not= $P
430
interval
scaled cost
t1
= ($P - $A) / $Q * $P
t2
= ($P - $B) / $Q * $P
t3
= ($P - $C) / $Q * $P
---
tM
etc...

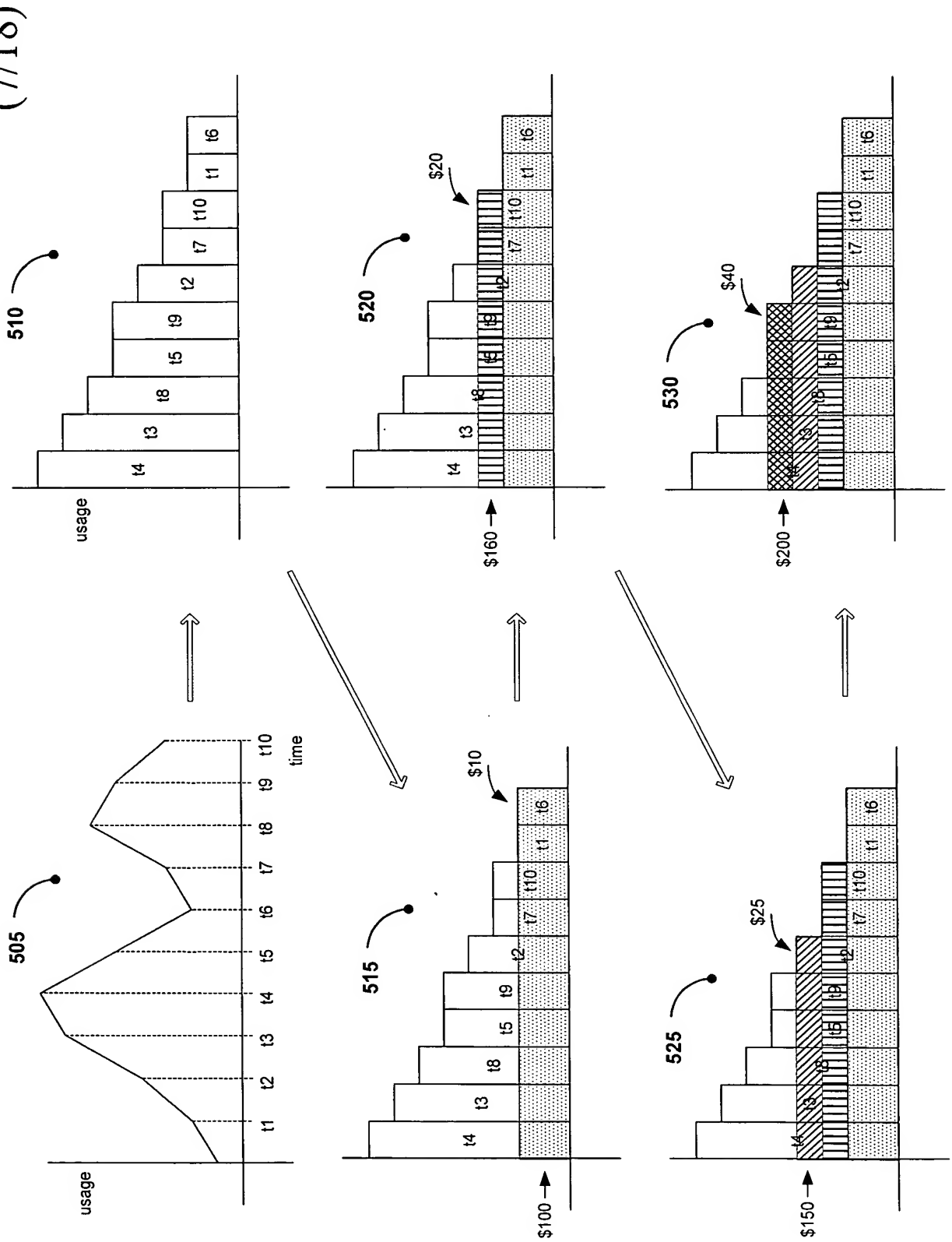

505
usage
time
t1
t2
t3
t4
t5
t6
t7
t8
t9
t10
510
515
520
525
530
$10
$20
$25
$40
$100
$150
$160
$200

FIG. 5a

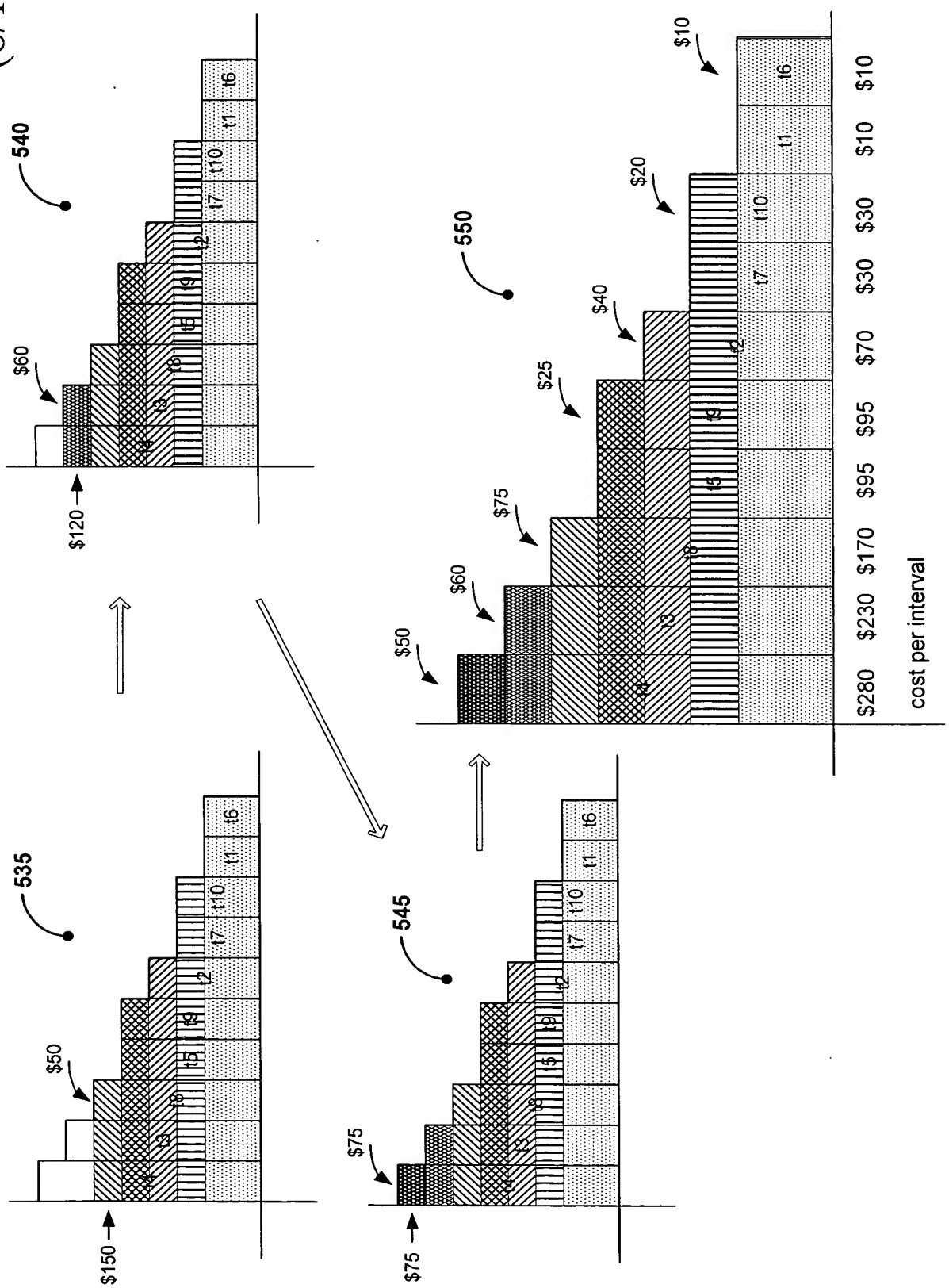

540
$60
$120
535
$50
$150
545
$75
$75
550
$10
$20
$40
$25
$75
$60
$50
$280
$230
$170
$95
$95
$70
$30
$30
$10
$10
cost per interval

FIG. 5b

FIG. 5c

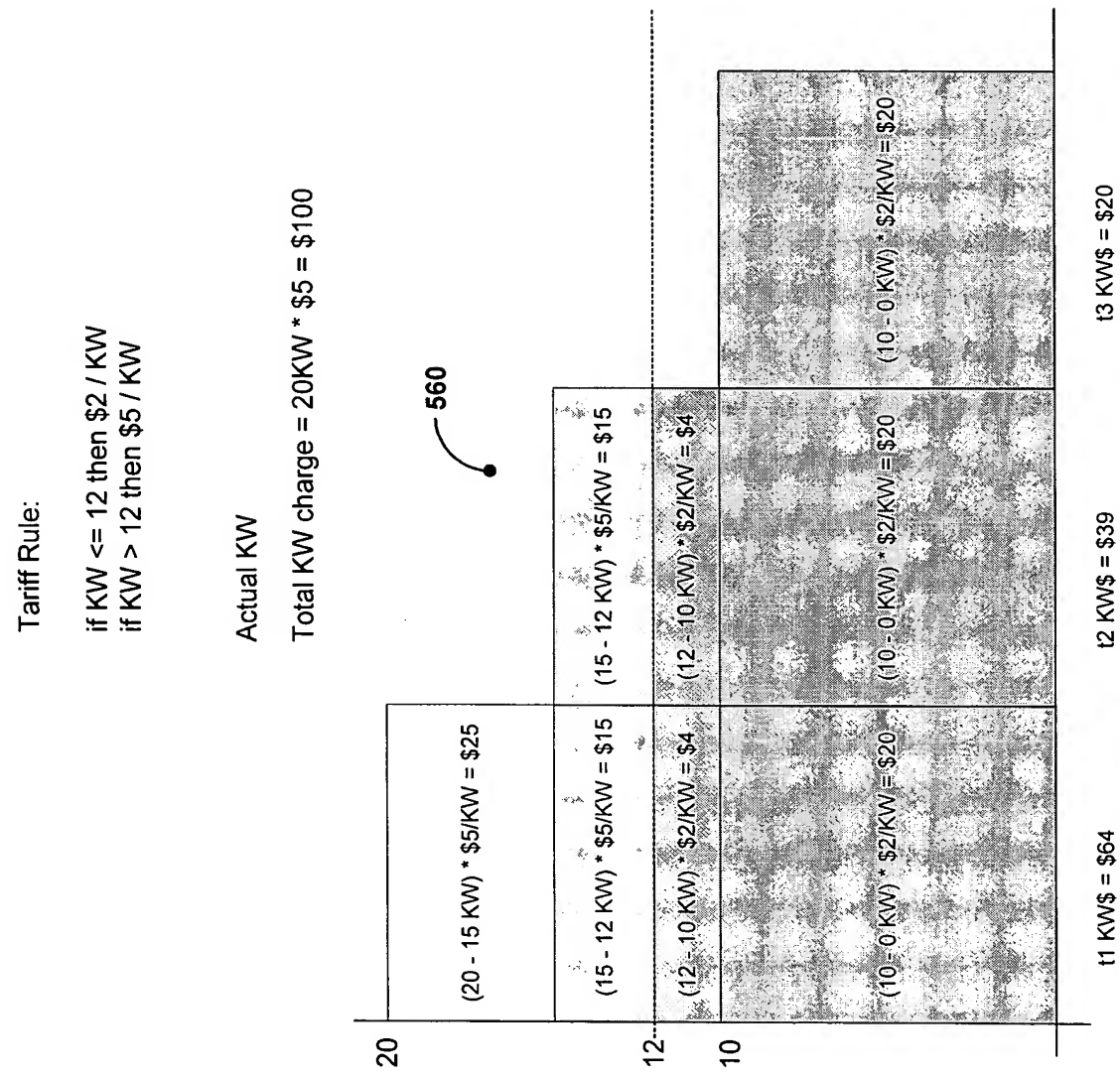

Tariff Rule:
if KW <= 12 then $2 / KW
if KW > 12 then $5 / KW
Actual KW
Total KW charge = 20KW * $5 = $100
560
20
12
10
(20 - 15 KW) * $5/KW = $25
(15 - 12 KW) * $5/KW = $15
(12 - 10 KW) * $2/KW = $4
(10 - 0 KW) * $2/KW = $20
t1 KW$ = $64
t2 KW$ = $39
t3 KW$ = $20

FIG. 5d

Patent Application For: A METHOD AND SYSTEM FOR DISTRIBUTING UTILITY COSTS
Inventor(s): John Christopher Van Gorp, J. Bradford Forth, Theresa M. Köster, Mark P. G. Koval, Daniel W. O'Neill, Daniel J. Wall
Attorney Docket No.: 6270/134

Tariff Rule:

if KW <= 12 then $2 / KW
if KW > 12 then $5 / KW

Total KW charge = 20KW * $5 = $100
KW <= 12 is $2 / KW so 12KW * $2/KW = $24
$100 - $24 = $76
$76 distributed to intervals above price step

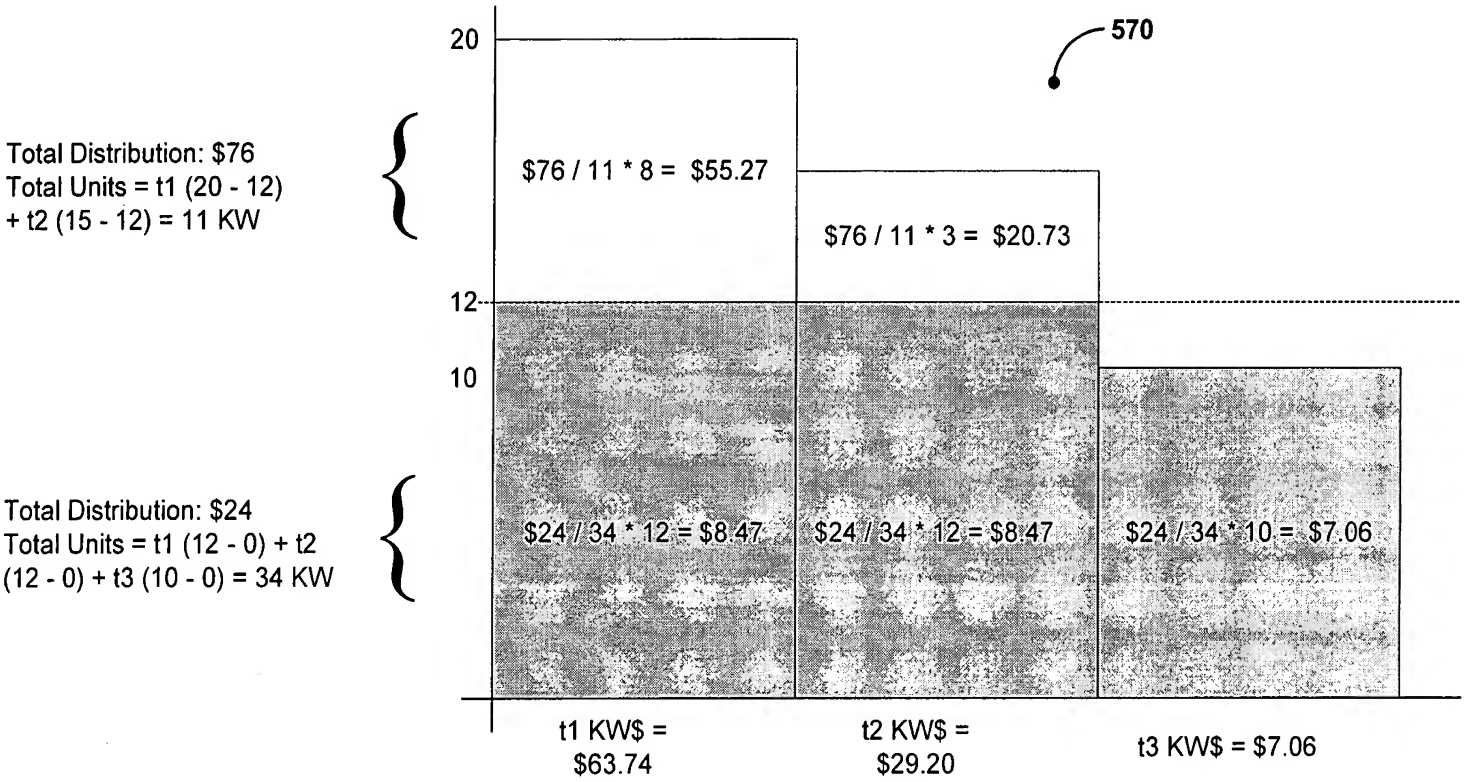
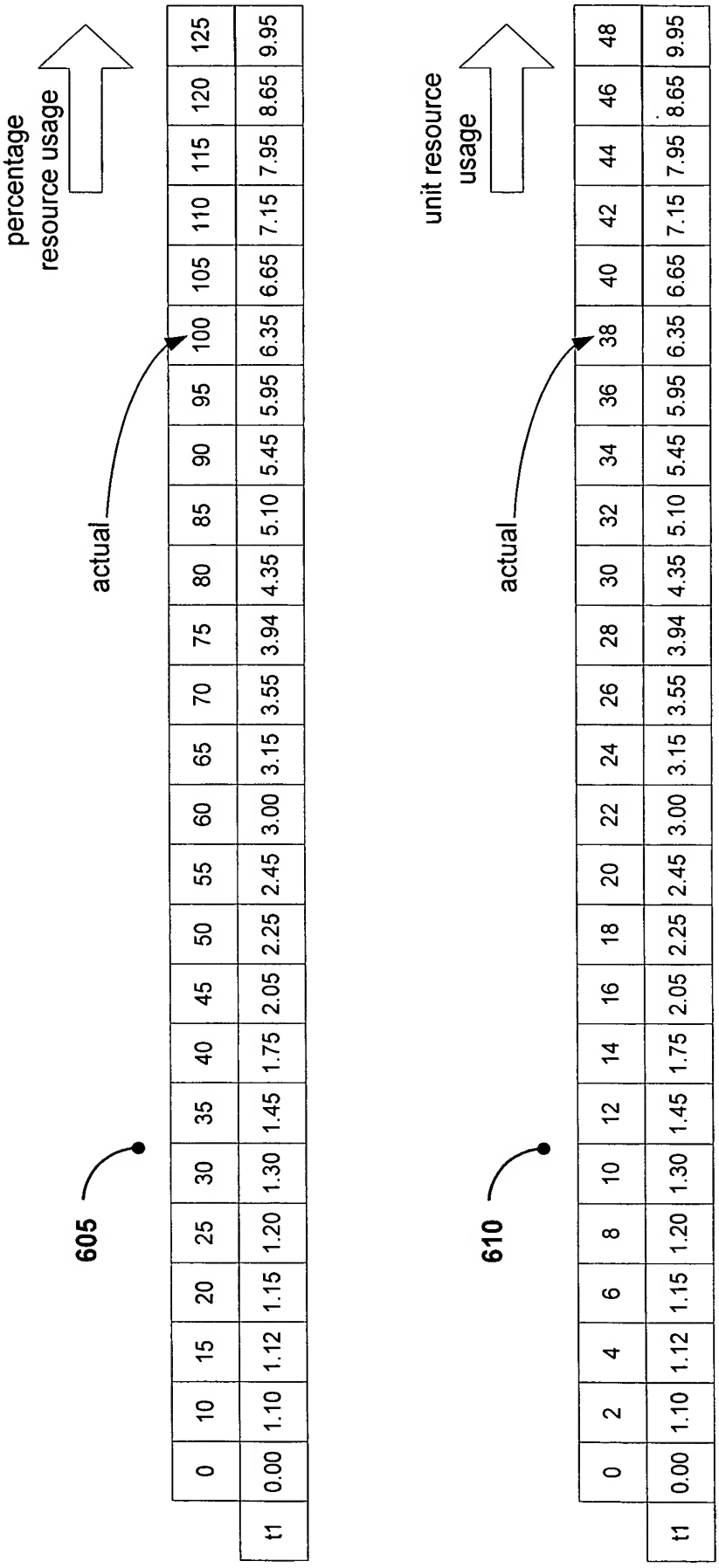


FIG. 6a



	0	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
t1	0.00	1.10	1.12	1.15	1.20	1.30	1.45	1.75	2.05	2.25	2.45	3.00	3.15	3.55	3.94	4.35	5.10	5.45	5.95	6.35	6.65	7.15	7.95	8.65	9.95

	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
t1	0.00	1.10	1.12	1.15	1.20	1.30	1.45	1.75	2.05	2.25	2.45	3.00	3.15	3.55	3.94	4.35	5.10	5.45	5.95	6.35	6.65	7.15	7.95	8.65	9.95

FIG. 6b

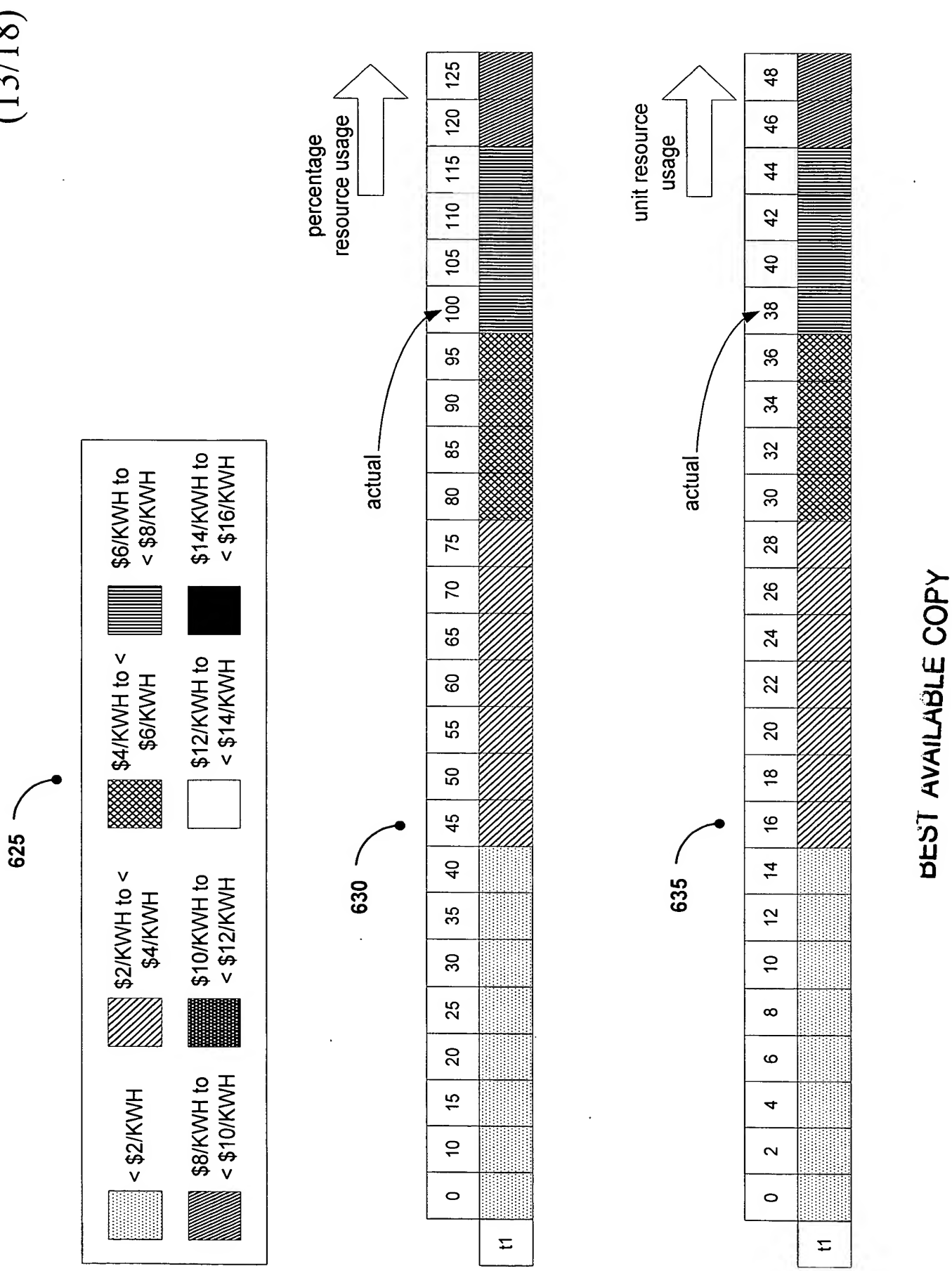
time intervals

615

resource usage

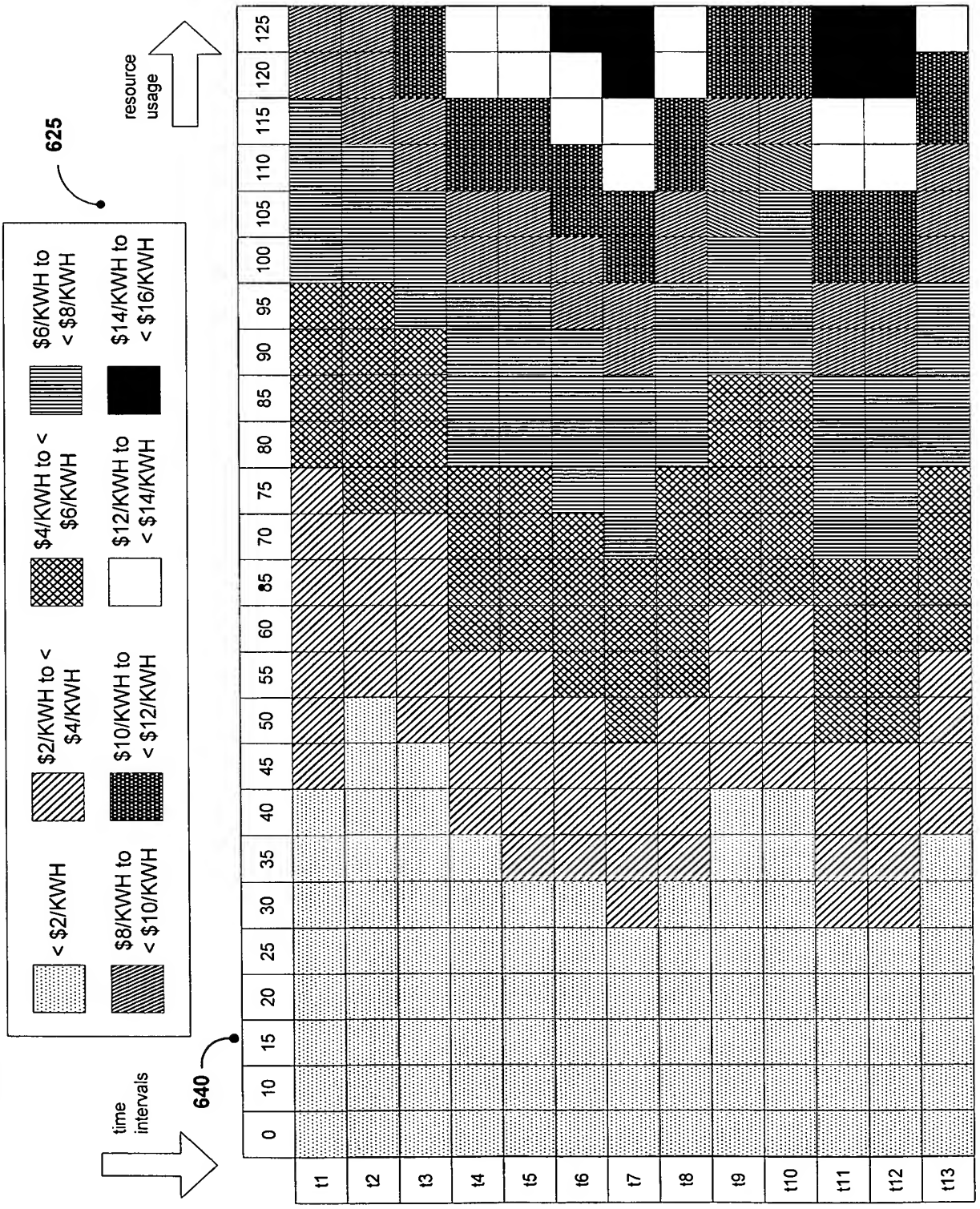
	0	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
t1	0.00	1.10	1.12	1.15	1.20	1.30	1.45	1.75	2.05	2.25	2.45	3.00	3.15	3.55	3.94	4.35	5.10	5.45	5.95	6.35	6.65	7.15	7.95	8.65	9.95
t2	0.00	1.10	1.10	1.12	1.15	1.20	1.30	1.45	1.65	1.85	2.25	2.57	3.26	3.78	4.05	4.55	5.00	5.55	6.00	6.40	6.85	7.35	8.05	8.80	9.25
t3	0.00	1.11	1.12	1.15	1.20	1.30	1.45	1.75	1.90	2.20	2.56	2.90	3.65	3.90	4.10	4.85	5.15	5.50	5.85	6.25	6.60	7.20	7.85	8.50	8.95
t4	0.00	1.10	1.12	1.15	1.25	1.35	1.55	2.00	2.20	2.45	2.70	3.10	3.25	3.60	3.85	4.30	4.95	5.35	5.65	6.00	6.45	7.00	7.65	8.20	8.95
t5	0.00	1.12	1.14	1.18	1.30	1.40	1.85	1.95	2.10	2.35	2.45	2.85	3.12	3.40	3.90	4.20	4.80	5.20	5.55	5.95	6.54	6.95	7.35	7.90	8.35
t6	0.00	1.13	1.16	1.20	1.35	1.45	2.00	2.25	2.50	2.75	3.00	3.25	3.55	3.80	4.10	4.40	4.75	5.25	5.80	6.10	6.50	6.95	7.40	7.95	8.35
t7	0.00	1.10	1.13	1.17	1.25	1.33	1.75	1.90	2.10	2.30	3.55	3.95	3.30	3.60	3.95	4.15	4.65	5.05	5.60	6.05	6.50	7.05	7.75	8.35	8.90
t8	0.00	1.15	1.18	1.22	1.26	1.35	1.50	1.75	2.05	2.25	2.40	2.76	3.15	3.40	3.80	4.05	4.60	5.00	5.50	5.91	6.30	6.75	7.15	7.50	8.00
t9	0.00	1.12	1.12	1.15	1.22	1.30	1.45	1.70	2.00	2.20	2.50	2.80	3.05	3.25	3.54	4.00	4.50	4.95	5.45	5.90	6.45	6.95	7.25	7.90	8.35
t10	0.00	1.11	1.14	1.19	1.25	1.35	1.50	1.85	2.14	2.45	2.80	3.05	3.30	3.40	3.70	4.15	4.55	5.00	5.50	5.95	6.15	6.10	6.10	6.10	7.70
t11	0.00	1.15	1.18	1.23	1.36	1.45	2.05	2.20	2.50	2.65	2.90	3.12	3.35	3.60	3.85	4.25	4.70	5.15	5.55	6.00	6.20	6.15	6.15	6.20	7.60
t12	0.00	1.12	1.15	1.21	1.34	1.34	1.95	2.15	2.45	2.70	3.00	3.20	3.40	3.75	4.05	4.60	5.00	5.40	5.75	6.20	6.20	6.21	6.22	6.23	6.24
t13	0.00	1.10	1.12	1.18	1.23	1.30	1.50	1.90	2.05	2.20	2.50	3.10	3.35	3.60	3.95	4.45	5.90	6.10	6.45	6.90	7.50	8.05	8.85	9.25	9.96

FIG. 6c



BEST AVAILABLE COPY

FIG. 6d



BEST AVAILABLE COPY

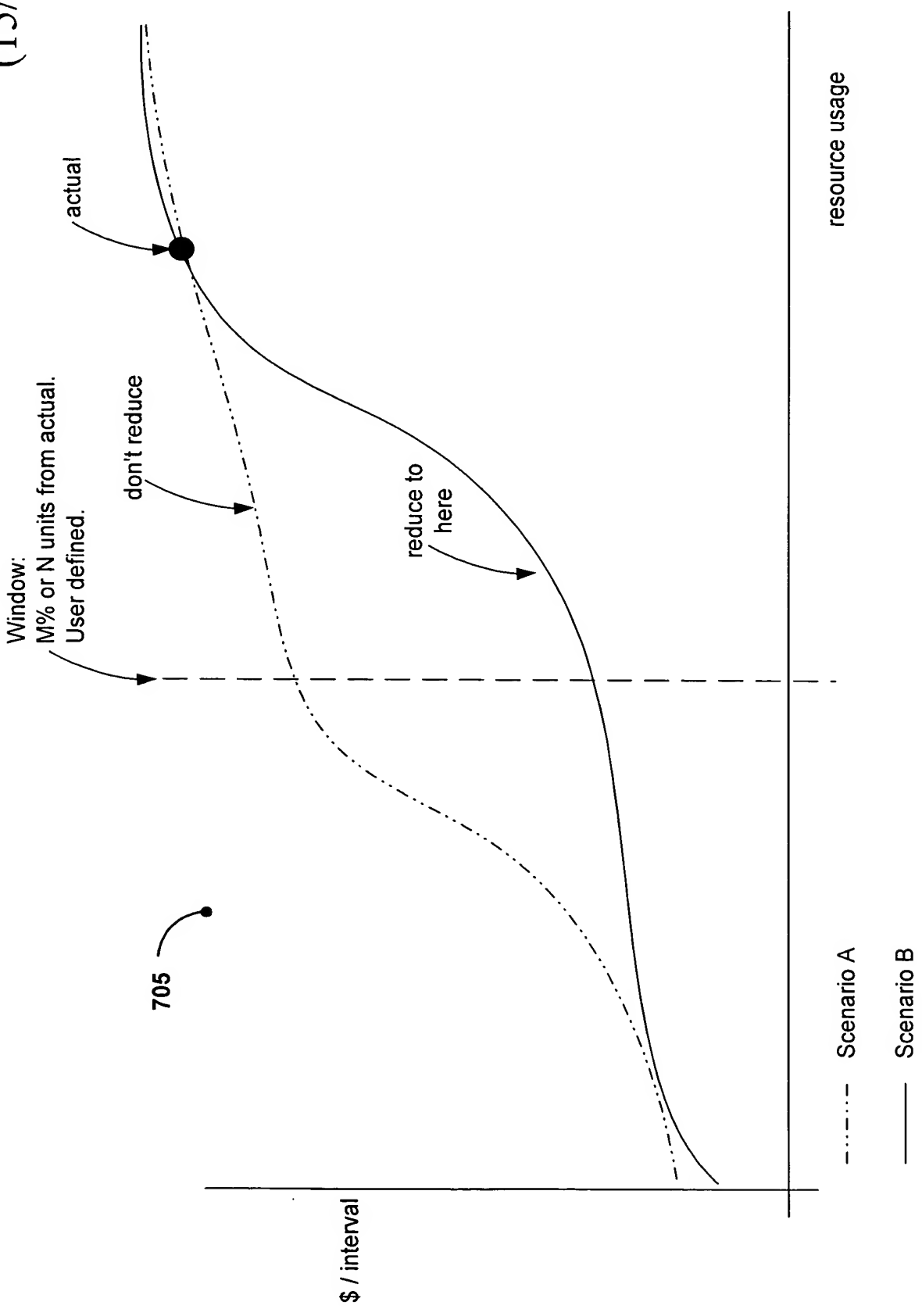

actual
don't reduce
reduce to here
Window:
M% or N units from actual.
User defined.
705
$ / interval
resource usage
Scenario A
Scenario B

FIG. 7a

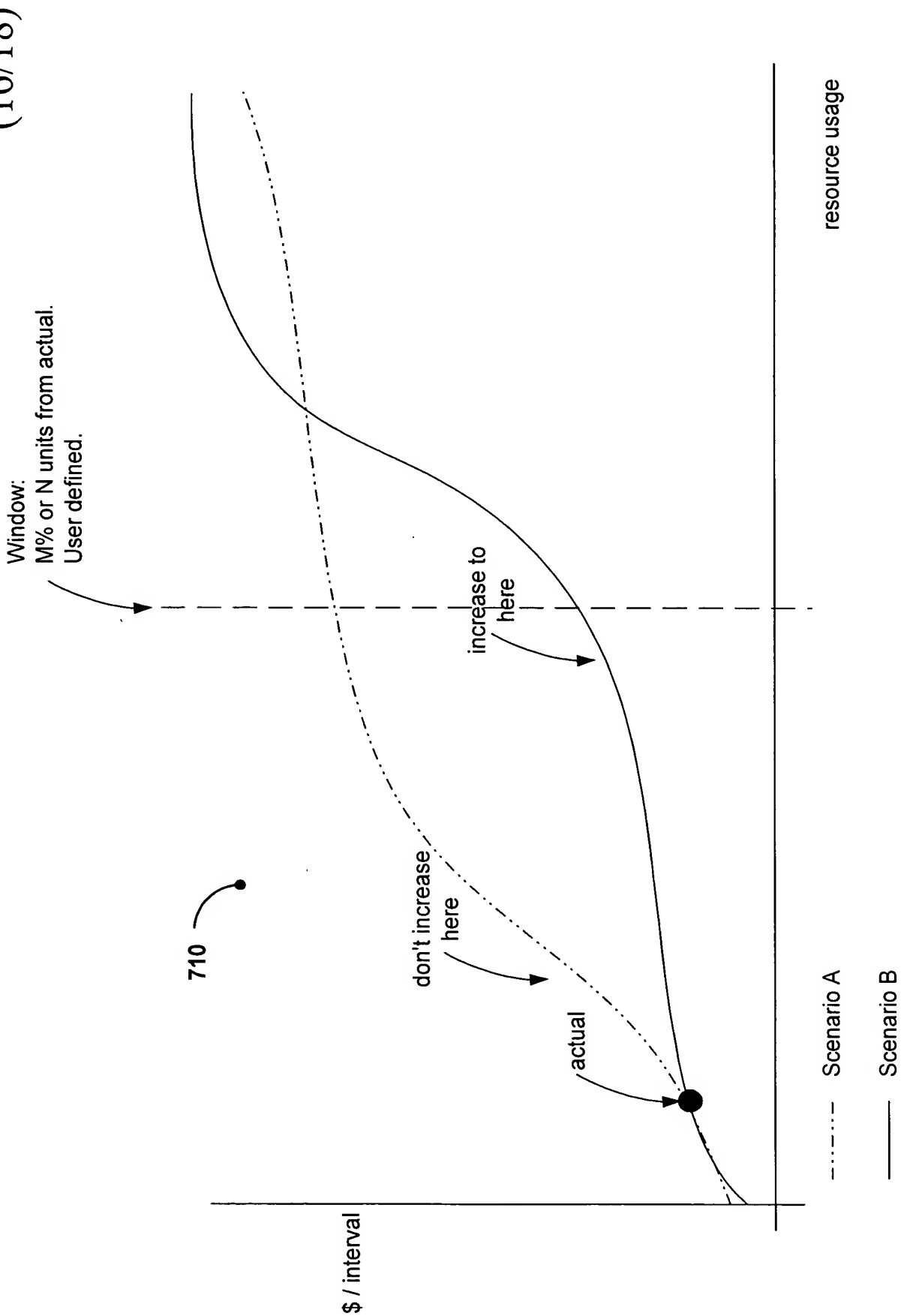

Window:
M% or N units from actual.
User defined.
increase to here
don't increase here
actual
710
$ / interval
resource usage
Scenario A
Scenario B

FIG. 7b

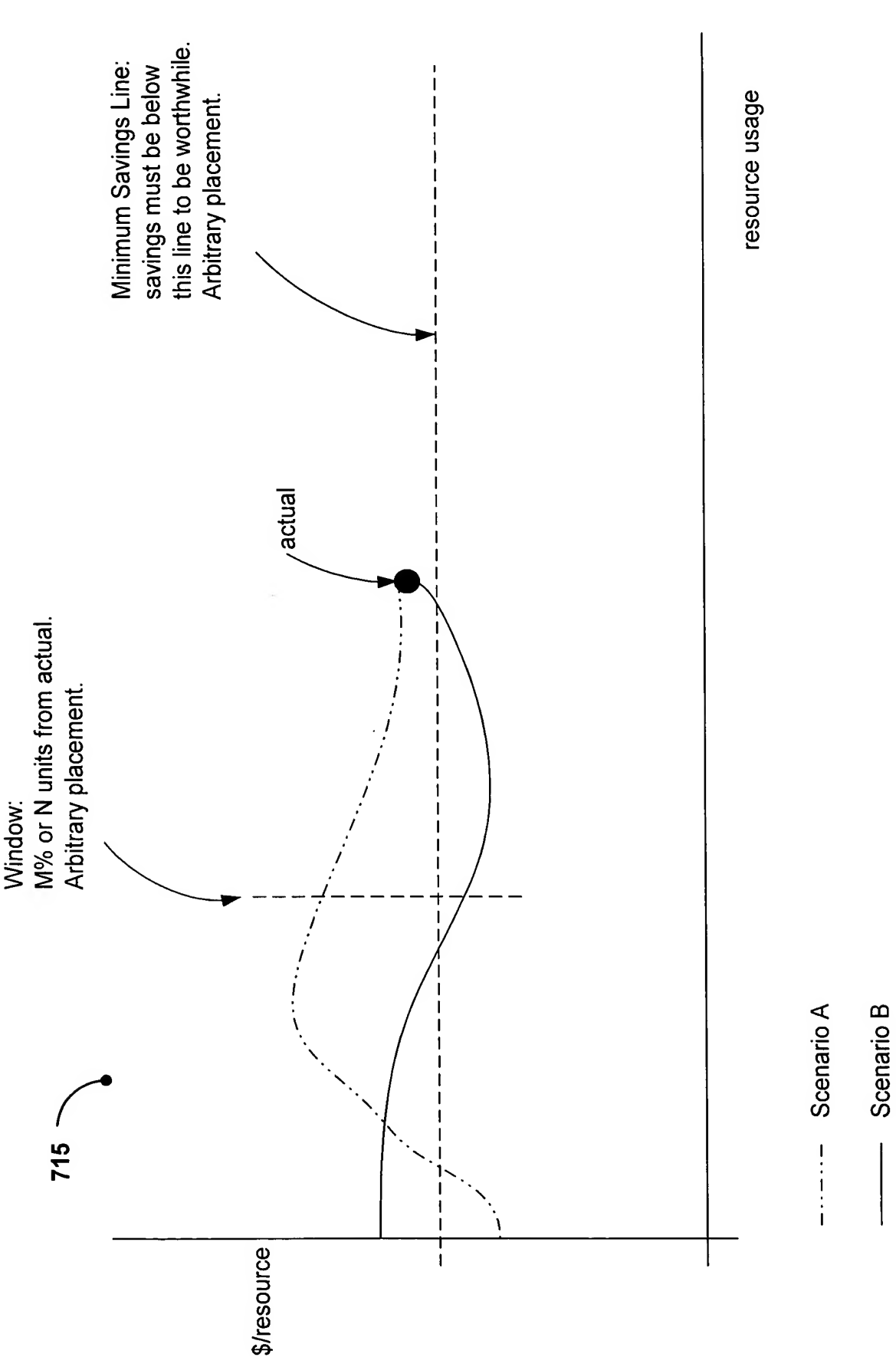
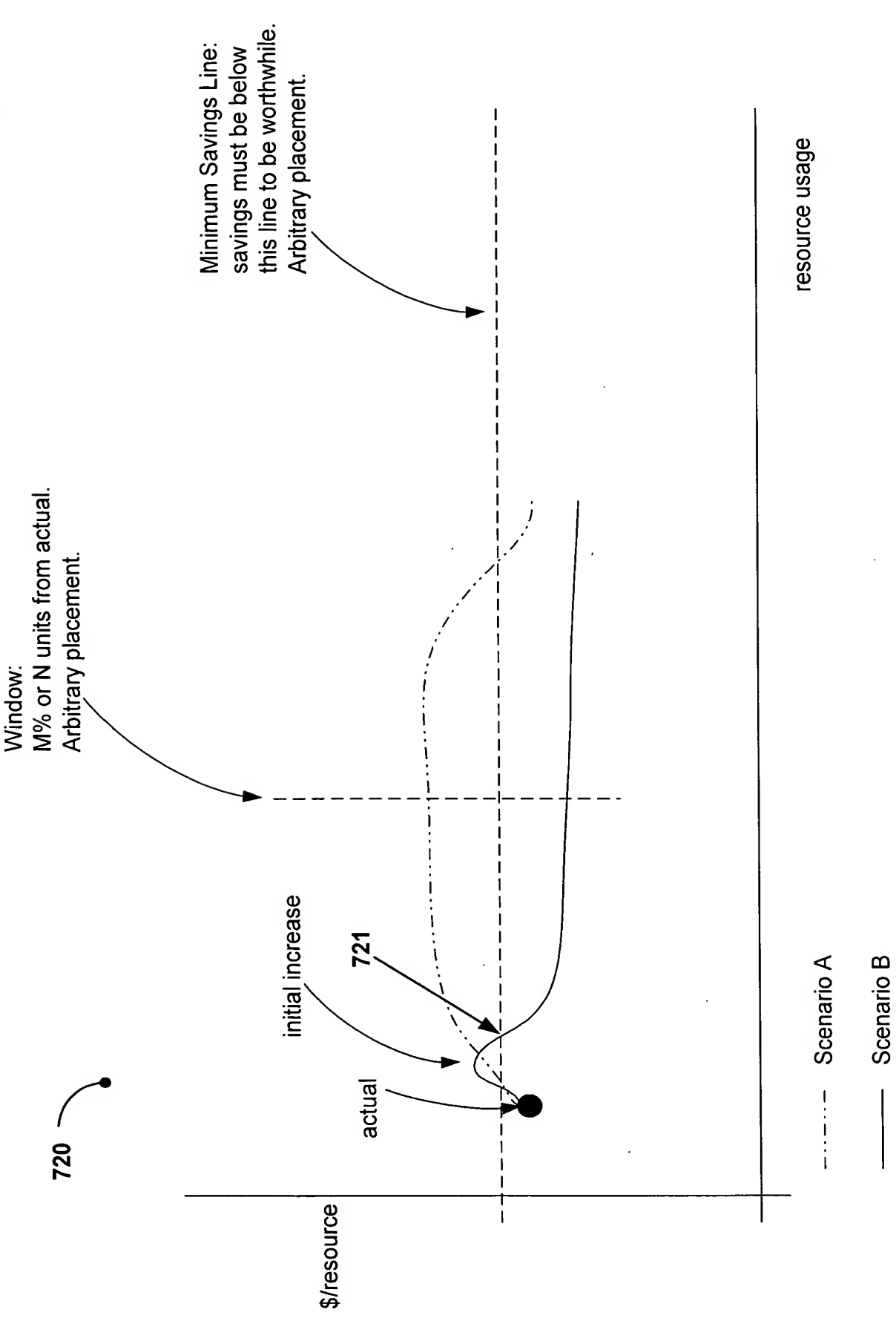

Minimum Savings Line:
savings must be below
this line to be worthwhile.
Arbitrary placement.
actual
Window:
M% or N units from actual.
Arbitrary placement.
715
$/resource
resource usage
Scenario A
Scenario B

FIG. 7c

FIG.7d


720
Window:
M% or N units from actual.
Arbitrary placement.
Minimum Savings Line:
savings must be below
this line to be worthwhile.
Arbitrary placement.
initial increase
721
actual
$/resource
resource usage
Scenario A
Scenario B